In re Patent Application of
COLEMAN ET AL.
Serial No. **10/761,014**
Filed: **JANUARY 20, 2004**

In the Claims:

This listing of claims replaces all prior versions and listing of claims in the application.

1. (Currently amended) An apparatus for generating a ~~relatively~~ wideband swept frequency signal comprising:

a first generator for generating a first swept frequency signal;

a second generator successively switching between different frequency signals and creating undesired phase discontinuities during switching;

a mixer connected to said first and second generators for mixing the first swept frequency signal and the successively switched different frequency signals to produce the ~~relatively~~ wideband swept frequency signal; and

a calibrator for calibrating said second generator to reduce the undesired phase discontinuities during switching based upon the ~~relatively~~ wideband swept frequency signal.

2. (Currently amended) The apparatus according to Claim 1 wherein said calibrator comprises a self-calibration feedback loop including:

a phase locked loop (PLL) receiving a reference frequency signal;

a mixer receiving the ~~relatively~~ wideband swept frequency signal and a phase reference signal from the PLL;

an analog-to-digital (a/d) converter receiving an output signal of the mixer; and

a controller connected to the a/d converter and providing a calibration signal to the second generator.

3. (Original) The apparatus method according to Claim 1, wherein said second generator generates an offset frequency signal and successively combines the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals.

4. (Original) The apparatus according to Claim 3, wherein said first generator comprises a first digital synthesizer and a translator to translate an output of said first digital synthesizer to generate the first swept frequency signal; and wherein said second generator comprises:

a second digital synthesizer to generate the offset frequency signal;

a plurality of frequency converters to successively combine the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals; and

a controller for controlling the operation of said second digital synthesizer to maintain phase continuity between the successively switched different frequency signals.

5. (Original) The apparatus according to Claim 1, wherein said second generator comprises:

a plurality of frequency converters receiving a reference frequency signal; and

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a second digital synthesizer providing an offset frequency signal to the plurality of frequency converters to successively combine the offset frequency signal with the reference frequency signal to produce the different frequency signals.

6. (Currently amended) An apparatus for generating a ~~relatively~~ wideband swept frequency signal comprising:

a first digital synthesizer for generating a first swept frequency signal;

a second generator successively switching between different frequency signals and creating undesired phase discontinuities during switching;

a mixer connected to said first and second digital synthesizers for mixing the first swept frequency signal and the successively switched different frequency signals to produce the ~~relatively~~ wideband swept frequency signal; and

a self-calibration feedback loop to reduce the undesired phase discontinuities during switching based upon the ~~relatively~~ wideband swept frequency signal, the self-calibration feedback loop comprising

a phase locked loop (PLL) receiving a reference frequency signal,

a mixer receiving the ~~relatively~~ wideband swept frequency signal and a phase reference signal from the PLL,

an analog-to-digital (a/d) converter receiving an output signal of the mixer, and

a controller connected to the a/d converter and providing a calibration signal to the second generator.

7. (Original) The apparatus according to Claim 6, wherein said second generator generates an offset frequency signal and successively combines the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals.

8. (Original) The apparatus according to Claim 7, wherein said second generator comprises:

a second digital synthesizer to generate the offset frequency signal; and

a plurality of frequency converters to successively combine the offset frequency signal with a reference frequency signal to produce the successively switched different frequency signals.

9. (Currently amended) A method for generating a ~~relatively~~ wideband swept frequency signal comprising:

generating a first swept frequency signal with a first generator;

successively switching between different frequency signals with a second generator while creating undesired phase discontinuities during switching;

combining the first swept frequency signal and the successively switched different frequency signals to produce the ~~relatively~~ wideband swept frequency signal; and

calibrating the second generator to reduce the undesired phase discontinuities during switching based upon the ~~relatively~~ wideband swept frequency signal.

10. (Original) The method according to Claim 9, wherein successively switching between different frequency signals comprises generating an offset frequency signal and successively combining the offset frequency signal with a reference frequency signal to produce the respective different frequency signals.

11. (Original) The method according to Claim 9, wherein the first generator comprises a first digital synthesizer; and wherein the second generator comprises a second digital synthesizer generating an offset frequency signal and successively combining the offset frequency signal with a reference frequency signal to produce the respective different frequency signals.

12. (Currently amended) The method according to Claim 11, wherein calibrating the second generator comprises comparing the phase of the ~~relatively~~ wideband swept frequency signal before and after successively switching between different frequency signals to determine the undesired phase discontinuities created during switching, and adjusting the phase of the offset frequency signal generated by the second

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digital synthesizer to reduce the undesired phase discontinuities created during switching.

13. (Currently amended) The method according to Claim 12, wherein determining the undesired phase discontinuities created during switching and adjusting the phase of the offset frequency signal generated by the second digital synthesizer comprises providing a self-calibration feedback loop including:

a phase locked loop (PLL) receiving the reference frequency signal;

a mixer receiving the ~~relatively~~ wideband swept frequency signal and a phase reference signal from the PLL;

an analog-to-digital (a/d) converter receiving an output signal of the mixer; and

a controller connected to the a/d converter and providing a calibration signal to the second digital synthesizer.

14. (Original) The method according to Claim 9, wherein successively switching between different frequency signals comprises:

connecting a plurality of frequency converters to an output of a reference frequency signal generator; and

coupling an offset frequency signal to the plurality of frequency converters to successively combine the offset frequency signal with the reference frequency signal to produce the different frequency signals.

15. (Currently amended) A method for generating a ~~relatively~~ wideband swept frequency signal comprising:

generating a first swept frequency signal with a first generator;

successively switching between different frequency signals with a second generator and creating undesired phase discontinuities during switching;

combining the first swept frequency signal and the successively switched different frequency signals to produce the ~~relatively~~ wideband swept frequency signal; and

calibrating the second generator by comparing the phase of the ~~relatively~~ wideband swept frequency signal before and after successively switching between different frequency signals to determine the undesired phase discontinuities created during switching, and adjusting the second generator to reduce the undesired phase discontinuities.

16. (Original) The method according to Claim 15, wherein successively switching between different frequency signals comprises generating an offset frequency signal and successively combining the offset frequency signal with a reference frequency signal to produce the respective different frequency signals.

17. (Original) The method according to Claim 15, wherein the first generator comprises a first digital synthesizer; and wherein the second generator comprises a second digital synthesizer generating an offset frequency signal and successively combining the offset frequency signal with a

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reference frequency signal to produce the respective different frequency signals.

18. (Currently amended) The method according to Claim 16, wherein determining the undesired phase discontinuities created during switching and adjusting the second generator comprises providing a self-calibration feedback loop including:

a phase locked loop (PLL) receiving a reference frequency signal;

a mixer receiving the ~~relatively~~ wideband swept frequency signal and a phase reference signal from the PLL;

an analog-to-digital (a/d) converter receiving an output signal of the mixer; and

a controller connected to the a/d converter and providing a calibration signal to the second generator.

19. (Original) The method according to Claim 15, wherein successively switching between different frequency signals comprises:

connecting a plurality of frequency converters to an output of a reference frequency signal generator; and

coupling an offset frequency signal to the plurality of frequency converters to successively combine the offset frequency signal with the reference frequency signal and produce the different frequency signals.